Sowela Technical Community College

Master Course Outline

Course Name: Trigonometry
Course Number: MATH 1110
Lecture contact hours: 45   **Lab contact hours:** 0
Semester Contact Hours: 3   **Semester Credit Hours:** 3 semester hours

Catalog Description: Includes the study of trigonometric functions and identities, inverse trigonometric functions, graphs, solving triangles and equations, complex numbers, vectors and polar coordinates.

Prerequisites: "C" or better in MATH 1100 (College Algebra)
Co-requisites: None

Required Textbook and Supplies:
 Trigonometry, 9th edition, by Margaret Lial, John Hornsby, David Schneider, Addison-Wesley, 2009.
 All students must have a user-friendly, graphing calculator. The Casio fx-9750 G Plus will be used for classroom demonstrations.

Student Learning Outcomes:
 Upon successful completion of this course, the student will be able to

- Demonstrate computational skills necessary for problem solving and mathematical modeling;
- Create, interpret, and revise models to solve problems;
- Convert angle measures between degrees, minutes, seconds and decimal degrees, and between degrees and radians;
- Find exact values of trigonometric functions of points on the unit circle, quadrantal angles, and integral multiples of $\pi/6=30°$, $\pi/4=45°$, and $\pi/3=60°$;
- Determine domain and range, period, and sign of trigonometric functions;
- Find values of trigonometric functions using fundamental identities;
- Graph trigonometric functions;
- Find values of inverse trigonometric functions;
- Establish trigonometric identities;
- Solve trigonometric equations;
- Solve right triangles;
- Solve triangles using Law of Sines and Law of Cosines;
- Convert between rectangular and polar coordinates;
- Graph polar equations;
- Use DeMoivre's Theorem and find complex roots of equations;
- Graph and perform operations with vectors;
- Graph and write equations of parabolas, hyperbolas, and ellipses.

Assessment Measures:
- 80% of final course average: 3-4 instructor-designed exams
- 20% of final course average: Comprehensive, departmental final exam assessing the student learning outcomes

Expanded Course Outline:
I. Trigonometric Functions
   a. Angles and Their Measure
   b. Trigonometric Functions: Unit Circle Approach
   c. Properties of the Trigonometric Functions
   d. Graphs of the Sine and Cosine Functions
   e. Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions
II. Analytic Trigonometry
   a. The Inverse Sine, Cosine, and Tangent Functions
   b. The Inverse Trigonometric Functions
   c. Trigonometric Identities
   d. Sum and Difference Formulas
   e. Double-angle and Half-angle Formulas
   f. Product-to-Sum and Sum-to-Product Formulas
   g. Trigonometric Equations
III. Applications of Trigonometric Functions
   a. Applications Involving Right Triangles
   b. The Law of Sines
   c. The Law of Cosines
   d. Area of a Triangle
   e. Simple Harmonic Motion; Damped Motion; Combining Waves
IV. Polar Coordinates: Vectors
   a. Polar Coordinates
   b. Polar Equations and Graphs
   c. The Complex Plane; DeMoivre's Theorem
   d. Vectors
   e. The Dot Product (optional)
   f. Vectors in Space (optional)
   g. The Cross Product (optional)
V. Analytic Geometry
   a. Conics
   b. The Parabola
   c. The Ellipse
   d. The Hyperbola
   e. Rotation of Axes; General Form of a Conic (optional)
   f. Polar Equations of conics (optional)
   g. Plane Curves and Parametric Equations (optional)